

Appendix E: Year Two CFF Technology Observation Data Tables

Q1: Learning Environment: Access to Technology					
	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
Teacher Access to Computer	94.70	98.50	-3.80	2.877	0.090
Presentation Station	47.30	73.30	-26.00	18.432	p<.001
Whiteboard	50.40	93.90	-43.50	61.697	p<.001
1 Student per Computer	29.00	74.80	-45.80	55.042	p<.001
2 Students per Computer	2.30	3.80	-1.50	0.516	0.361
3-5 Students per Computer	2.30	2.30	0.00	0.000	1.000
More than 5 Students	19.80	3.80	16.00	16.135	p<.001
Internet Access is Available to all Computers	81.70	89.30	-7.60	3.078	0.057

Q2: Learning Environment: Organization of the Classroom					
	Pre (%)	Post (%)	Change	Pearson Value	Significance
Traditional Rows	75.80	71.60	4.20	2.494	0.646
Small Clusters of Desks	14.10	20.60	-6.50		
Circles or Semi-circles	5.10	3.90	1.20		
Desks along classroom walls	1.00	0.00	0.00		
Other	4.00	3.90	0.10		

Q3: Beginning 1/3 of Class Period: Classroom Teacher Activity					
	Pre Mean	Post Mean	Difference	t-test	Significance
Whole Class Lecture/Instruction	31.82	27.14	4.68	1.240	0.216
Leading a Whole Class Discussion	25.98	25.46	0.52	0.141	0.888
Working with a Small Group	7.34	9.72	-2.38	-1.069	0.286
Working with Individual Students	11.52	15.25	-3.73	-1.394	0.165
Walking, Observing, and Interacting with Students	16.84	17.52	-0.68	-0.260	0.795
Working at Desk, or other Professional Work not involving Students	6.50	4.91	1.59	0.905	0.366

Q4: Beginning 1/3 of Class Period: Level of Student Engagement					
	Pre Mean	Post Mean	Difference	t-test	Significance
Percentage of Students Engaged	74.82	79.49	-4.67	-1.257	0.210
Level of Engagement	3.08	3.59	-0.51	-5.073	0.155

Q5-7: Beginning 1/3 of Class Period: Instructional Practices					
	Pre Mean	Post Mean	Difference	t-test	Significance
Complexity	3.94	4.58	-0.64	-4.631	p<.001
Instructional Style	3.52	4.15	-0.63	-4.266	p<.001
Relevance	4.07	4.64	-0.57	-4.081	p<.001

Q8: Middle 1/3 of Class Period: Classroom Teacher Activity					
	Pre Mean	Post Mean	Difference	t-test	Significance
Whole Class Lecture/Instruction	29.85	17.19	12.66	3.464	p<.001
Leading a Whole Class Discussion	26.28	23.49	2.79	0.759	0.449
Working with a Small Group	9.24	13.25	-4.01	-1.434	0.153
Working with Individual Students	14.74	21.43	-6.69	-2.151	0.032
Walking, Observing, and Interacting with Students	15.47	20.00	-4.53	-1.520	0.130
Working at Desk, or other Professional Work not involving Students	4.44	4.64	-0.20	-0.137	0.891

Q9: Middle 1/3 of Class Period: Level of Student Engagement					
	Pre Mean	Post Mean	Difference	t-test	Significance
Percentage of Students Engaged	75.27	81.10	-5.83	-1.547	0.123
Level of Engagement	3.37	3.78	-0.41	-4.206	p<.001

Q10-12: Middle 1/3 of Class Period: Instructional Practices					
	Pre Mean	Post Mean	Difference	t-test	Significance
Complexity	4.27	4.85	-0.58	-4.753	p<.001
Instructional Style	3.77	4.48	-0.71	-4.864	p<.001
Relevance	4.18	4.81	-0.63	-4.552	p<.001

Q13: Final 1/3 of Class Period: Classroom Teacher Activity					
	Pre Mean	Post Mean	Difference	t-test	Significance
Whole Class Lecture/Instruction	24.60	12.54	12.06	3.765	0.000
Leading a Whole Class Discussion	24.14	22.59	1.55	0.429	0.669
Working with a Small Group	10.10	15.57	-5.47	-1.986	0.048
Working with Individual Students	17.67	22.94	-5.27	-1.761	0.079
Walking, Observing, and Interacting with Students	18.47	22.48	-4.01	-1.336	0.183
Working at Desk, or other Professional Work not involving Students	5.02	3.97	1.05	0.672	0.502

Q14: Final 1/3 of Class Period: Level of Student Engagement					
	Pre Mean	Post Mean	Difference	t-test	Significance
Percentage of Students Engaged	67.60	80.16	-12.56	-3.123	0.002
Level of Engagement	3.22	3.81	-0.59	-5.322	p<.001

Q15-17 Final 1/3 of Class Period: Instructional Practices					
	Pre Mean	Post Mean	Difference	t-test	Significance
Complexity	4.18	4.86	-0.68	-4.856	p<.001
Instructional Style	3.64	4.65	-1.01	-6.518	p<.001
Relevance	4.11	4.85	-0.74	-4.651	p<.001

Q18a: Post Class Wrap-Up: Student Work/Products: Students are Working on a Clearly Defined Task or Tasks					
	Frequency			Chi-Square	
	Pre	Post	Change	Pearson Value	Significance
Yes	92.4	93.1	-0.70	3.317	0.535
No	3.8	3.8	0.00		
Don't Know	3.1	0.8	2.30		
Not Applicable	0	0.8	-0.80		
No Response	0.8	1.5	-0.70		

Q18b: Post Class Wrap-Up: Student Work/Products: Students are given the opportunity to demonstrate learning in a variety of ways.					
	Frequency			Chi-Square	
	Pre	Post	Change	Pearson Value	Significance
Yes	55.00	74.00	-19.00	12.553	0.014
No	38.20	22.10	16.10		
Don't Know	0.80	0.80	0.00		
Not Applicable	6.10	2.30	3.80		
No Response	0.00	0.80	-0.80		

Q18c: Post Class Wrap-Up: Student Work/Products: Student can choose end products based on their own interests.					
	Frequency			Chi-Square	
	Pre	Post	Change	Pearson Value	Significance
Yes	17.60	32.10	-14.50	9.863	0.043
No	64.10	55.70	8.40		
Don't Know	6.90	3.10	3.80		
Not Applicable	11.50	8.40	3.10		
No Response	0.00	0.80	-0.80		

Q18d: Post Class Wrap-Up: Student Work/Products: There is a clear Rubric that will be used to assess Project Work					
	Frequency			Chi-Square	
	Pre	Post	Change	Pearson Value	Significance
Yes	35.10	55.00	-19.90	12.083	0.017
No	32.10	21.40	10.70		
Don't Know	9.20	7.60	1.60		
Not Applicable	23.70	15.30	8.40		
No Response	0.00	0.80	-0.80		

Q18e: Post Class Wrap-Up: Student Work/Products: Students are working on different Products					
	Frequency			Chi-Square	
	Pre	Post	Change	Pearson Value	Significance
Yes	20.60	41.20	-20.60	15.953	p<0.01
No	71.80	50.40	21.40		
Don't Know			0.00		
Not Applicable	7.60	6.90	0.70		
No Response	0.00	1.50	-1.50		

Q18f: Post Class Wrap-Up: Student Work/Products: Students can choose to work on Individual or Group Products					
	Frequency			Chi-Square	
	Pre	Post	Change	Pearson Value	Significance
Yes	22.10	39.70	-17.60	13.531	0.009
No	66.40	48.10	18.30		
Don't Know	0.80	3.10	-2.30		
Not Applicable	10.70	8.40	2.30		
No Response	0.00	0.80	-0.80		

Q18g: Post Class Wrap-Up: Student Work/Products: Students Allowed to Work at Their Own Pace					
	Frequency			Chi-Square	
	Pre	Post	Change	Pearson Value	Significance
Yes	55.00	74.00	-19.00	16.023	0.003
No	33.60	21.40	12.20		
Don't Know	3.10	0.00	3.10		
Not Applicable	7.60	2.30	5.30		
No Response	0.80	2.30	-1.50		

Q19: Post Class Wrap-Up: Classroom Management					
	Frequency			Chi-Square	
	Pre	Post	Change	Pearson Value	Significance
Excellent	52.70	58.90	-6.20	2.596	0.458
Good	38.80	34.90	3.90		
Fair	8.50	5.40	3.10		
Poor	0.00	0.80	-0.80		

Q20: Post Class Wrap-Up: Teacher Comfort Level					
	Frequency			Chi-Square	
	Pre	Post	Change	Pearson Value	Significance
Could not tell	3.10	3.80	-0.70	11.157	0.025
Teacher seemed completely Uncomfortable	4.70	1.50	3.20		
Teacher seemed fairly uncomfortable	2.30	4.60	-2.30		
Teacher seemed fairly comfortable	33.60	18.50	15.10		
Teacher seemed completely comfortable	56.30	71.50	-15.20		

Q21: Post Class Wrap-Up: Teachers Use of Hardware					
	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
Teacher use of Laptops	35.10	70.20	-35.10	34.293	P<.001
Teacher use of Desktop Computer	52.70	48.90	3.80	0.382	0.537
Teacher use of PDA's	0.80	1.50	-0.70	0.337	0.561
Teacher use of Calculators	18.30	21.40	-3.10	0.384	0.536
Teacher use of Camera, Still or Video	1.50	5.30	-3.80	2.877	0.090
Teacher use of TV/VCR	22.10	22.10	0.00	0.000	1.000
Teacher use of Probeware	0.80	2.30	-1.50	1.016	0.311
Teacher use of Microscope camera/Projector	0.80	2.30	-1.50	1.016	0.311
Teacher use of LCD Projector	42.70	60.30	-17.60	8.084	0.004

Q22: Post Class Wrap-Up: Student Use of Hardware					
	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
Student use of Laptops	17.60	60.30	-42.70	50.345	P<.001
Student use of Desktop Computer	3.10	1.50	1.60	0.682	0.409
Student use of PDA's	0.00	0.80	-0.80	1.004	0.500
Student use of Calculators	20.60	27.50	-6.90	1.693	0.193
Student use of Camera, Still or Video	1.50	5.30	-3.80	2.877	0.090
Student use of TV/VCR	1.50	6.90	-5.40	4.650	0.030
Student use of Probeware	0.80	2.30	-1.50	1.016	0.311
Student use of Microscope camera/Projector	1.50	1.50	0.00	0.000	1.000
Student use of LCD Projector	4.60	13.70	-9.10	6.605	0.008

Q23: Post Class Wrap-Up: Teachers Use of Software					
	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
Management Software	10.70	16.00	-5.30	1.616	0.138
Drill & Practice, ILS, or Educational Games	27.50	34.40	-6.90	1.448	0.142
Word Processing	23.70	31.30	-7.60	1.915	0.106
Data Management (Spreadsheets) or Analysis Software	38.90	55.00	-16.10	6.758	0.009
Database Software	20.60	26.70	-6.10	1.352	0.245
Presentation Software	13.70	21.40	-7.70	2.637	0.104
Email	6.90	13.70	-6.80	3.345	0.051
Other Communication Tools	26.70	45.80	-19.10	10.321	0.001
Desktop Publishing Software	6.10	10.70	-4.60	1.786	0.181
Web Publishing Software	5.30	14.50	-9.20	6.149	0.013
Internet for Research	8.40	13.00	-4.60	1.440	0.230
Multimedia Reference CDs	0.80	5.30	-4.50	0.031	0.066
Simulations/Modeling Software	7.60	13.70	-6.10	2.559	0.080
Software for Video, Graphics, and Sound Editing or Production	0.80	6.10	-5.30	5.638	0.018
Probeware	0.80	8.40	-7.60	8.733	0.003
Web Based Digital Resources	0.00	9.90	-9.90	13.679	0.000
Other Web Based Resources	5.30	17.60	-12.30	9.637	0.002

Q24: Post Class Wrap-Up: Student Use of Software					
	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
Management Software	5.30	20.60	-15.30	13.519	0.000
Drill & Practice, ILS, or Educational Games	15.30	38.20	-22.90	17.545	0.000
Word Processing	8.40	18.30	-9.90	5.573	0.018
Data Management (Spreadsheets) or Analysis Software	7.60	31.30	-23.70	23.398	0.000
Database Software	3.80	11.50	-7.70	5.413	0.020
Presentation Software	2.30	15.30	-13.00	13.774	0.000
Email	2.30	10.70	-8.40	7.612	0.006
Other Communication Tools	18.30	52.70	-34.40	33.756	P<.001
Desktop Publishing Software	1.50	4.60	-3.10	2.063	0.151
Web Publishing Software	2.30	13.00	-10.70	10.610	0.001
Internet for Research	4.60	14.50	-9.90	7.473	0.006
Multimedia Reference CDs	1.50	4.60	-3.10	2.063	0.151
Simulations/Modeling Software	2.30	11.50	-9.20	8.590	0.003
Video, Graphics, and Sound Editing or Production	0.80	3.80	-3.00	2.729	0.099
Probeware	0.00	6.10	-6.10	8.252	0.004
Websites	0.80	6.10	-5.30	5.638	0.018
Other Web Based Resources	6.10	14.50	-8.40	4.996	0.025

Q25a: Instructional Strategies: Teacher Lecture or Demonstration	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	6.90	12.20	-5.30	27.948	0.000
A Little	24.40	45.80	-21.40		
Fair Amount	40.50	29.00	11.50		
Most	24.40	6.90	17.50		
All	0.00	1.50	-1.50		
No Response	3.80	4.60	-0.80		

Q25b: Teacher-led Low Level Discussion	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	9.90	13.70	-3.80	4.365	0.498
A Little	42.00	38.20	3.80		
Fair Amount	30.50	34.40	-3.90		
Most	12.20	6.90	5.30		
All	0.00	0.80	-0.80		
No Response	5.30	6.10	-0.80		

Q25c: Teacher-led High Level Discussion	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	22.90	27.50	-4.60	7.153	0.210
A Little	28.20	21.40	6.80		
Fair Amount	28.20	34.40	-6.20		
Most	14.50	9.20	5.30		
All	1.50	0.00	1.50		
No Response	4.60	7.60	-3.00		

Q25d: Project or Problem Based Learning	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	44.30	22.90	21.4	18.727	0.002
A Little	15.30	16.00	-0.70		
Fair Amount	11.50	13.70	-2.20		
Most	17.60	35.90	-18.30		
All	3.10	5.30	-2.20		
No Response	8.40	6.10	2.30		

Q25e: Authentic Learning	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	29.00	20.60	8.40	14.206	0.014
A Little	25.20	13.70	11.50		
Fair Amount	24.40	29.00	-4.60		
Most	10.70	22.90	-12.20		
All	2.30	5.30	-3.00		
No Response	8.40	8.40	0.00		

Q25f: Multi-Modal Teaching	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	39.70	22.10	17.60	16.035	0.007
A Little	26.00	22.10	3.90		
Fair Amount	19.80	32.10	-12.30		
Most	4.60	10.70	-6.10		
All	0.00	1.50	-1.50		
No Response	9.90	11.50	-1.60		

Q25g: Peer Teaching	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	64.90	35.90	29.00	24.620	0.000
A Little	16.80	29.80	-13.00		
Fair Amount	7.60	18.30	-10.70		
Most	3.80	4.60	-0.80		
All	0.00	1.50	-1.50		
No Response	6.90	9.90	-3.00		

Q25h: Collaborative Learning—Informal	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	42.00	16.80	25.20	21.660	0.001
A Little	25.20	33.60	-8.40		
Fair Amount	19.80	26.00	-6.20		
Most	7.60	14.50	-6.90		
All	.80	3.10	-2.30		
No Response	4.60	6.10	-1.50		

Q25i: Collaborative Learning—Formal Roles	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	58.00	40.50	17.50	10.859	0.054
A Little	17.60	22.10	-4.50		
Fair Amount	12.20	17.60	-5.40		
Most	2.30	7.60	-5.30		
All	0.80	2.30	-1.50		
No Response	9.20	9.90	-0.70		

Q25j: Web Quests	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	87.00	68.70	18.30	19.801	0.001
A Little	1.50	5.30	-3.80		
Fair Amount	0.00	9.20	-9.20		
Most	2.30	2.30	0.00		
All	0.00	0.80	-0.80		
No Response	9.20	13.70	-4.50		

Q25k: Learning Centers	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	85.50	73.30	12.20	11.508	0.042
A Little	4.60	5.30	-0.70		
Fair Amount	0.00	6.10	-6.10		
Most	.80	0.80	0.00		
All	0.00	.80	-0.80		

Q26: Percentage of Students who Actively used Technology					
	Pre Mean	Post Mean	Difference	t-test	Significance
Not at All	31.89	15.59	16.30	3.239	0.002
Briefly during the Period	9.69	5.19	4.50	1.666	0.098
About one-fourth of the Period	5.10	8.65	-3.55	-1.229	0.221
About half the Period	10.18	7.47	2.71	0.884	0.378
About three-fourths of the Period	8.04	13.94	-5.90	-1.800	0.074
Almost the Entire Period	14.47	41.24	-26.77	-5.229	0.000

Q27: Percentages of Student Activity					
	Pre Mean	Post Mean	Difference	t-test	Significance
Listening to the Teacher	42.66	29.61	13.05	4.322	.000
Listening to other students (in a large group setting)	14.95	16.13	-1.18	-5.17	.606
Working Independently	18.21	23.11	-4.90	-1.842	.068
Working in Groups	11.82	17.68	-5.86	-1.902	.059
Talking with the Teacher in 1-to-1 or Small Group Conversations	8.12	10.92	-2.80	-1.781	.077
Off task (not doing what the teacher intended)	2.84	2.38	0.46	.732	.466

Q28a: Visual Literacy	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	17.60	10.70	6.90	12.200	0.032
A Little	42.00	35.10	6.90		
A lot	27.50	45.80	-18.30		
Not Applicable	6.10	4.60	1.50		
No Response	6.90	3.10	3.80		

Q28b: Scientific Literacy	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	40.50	32.10	8.40	6.960	0.138
A Little	21.40	25.20	-3.80		
A lot	13.70	23.70	-10.00		
Not Applicable	14.50	13.70	0.80		
No Response	9.90	5.30	4.60		

Q28c: Cultural Literacy or Global Literacy	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	32.80	27.50	5.30	8.654	0.070
A Little	26.00	23.70	2.30		
A lot	18.30	32.80	-14.50		
Not Applicable	14.50	12.20	2.30		
No Response	8.40	3.80	4.60		

Q28d: Teaming or Collaboration Skills	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	46.60	27.50	19.10	23.655	0.000
A Little	23.70	26.00	-2.30		
A lot	10.70	33.60	-22.90		
Not Applicable	10.70	7.60	3.10		
No Response	8.40	5.30	3.10		

Q28e: E-Communication Skills	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	55.70	41.20	14.50	12.628	0.013
A Little	14.50	28.20	-13.70		
A lot	6.10	9.90	-3.80		
Not Applicable	13.70	16.00	-2.30		
No Response	9.90	4.60	5.30		

Q28f: Social or Personal Responsibility	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	29.80	14.50	15.30	10.006	0.040
A Little	29.00	35.90	-6.90		
A lot	24.40	33.60	-9.20		
Not Applicable	9.20	9.90	-0.70		
No Response	7.60	6.10	1.50		

Q28g: Self-Direction	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	19.10	11.50	7.60	14.844	0.005
A Little	37.40	38.90	-1.50		
A lot	27.50	44.30	-16.80		
Not Applicable	6.10	1.50	4.60		
No Response	9.90	3.80	6.10		

Q28h: Creativity	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	35.90	23.70	12.20	20.038	0.000
A Little	31.30	30.50	0.80		
A lot	15.30	37.40	-22.10		
Not Applicable	9.90	3.80	6.10		
No Response	7.60	4.60	3.00		

Q28i: Higher Order Thinking	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	13.00	11.50	1.50	6.601	0.159
A Little	46.60	35.10	11.50		
A lot	32.80	48.10	-15.30		
Not Applicable	0.80	0.80	0.00		
No Response	6.90	4.60	2.30		

Q28j: Use of Real World Tools	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	32.80	13.70	19.10	35.929	p<.001
A Little	32.10	22.10	10.00		
A lot	20.60	55.70	-35.10		
Not Applicable	6.90	3.80	3.10		
No Response	7.60	4.60	3.00		

Q28k: Ability to Produce High Quality Products	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	35.90	19.80	16.10	25.381	0.000
A Little	26.70	26.70	0.00		
A lot	16.00	42.00	-26.00		
Not Applicable	13.00	6.10	6.90		
No Response	8.40	5.30	3.10		

Q28l: Planning, Prioritizing, and Managing Work	Frequency			Chi Square	
	Pre (%)	Post (%)	Change	Pearson Value	Significance
None	28.20	16.00	12.20	27.948	0.000
A Little	29.00	30.50	-1.50		
A lot	26.00	42.00	-16.00		
Not Applicable	8.40	3.80	4.60		
No Response	3.80	4.60	-0.80		